

Amendment
Serial No. 10/688,568

IN THE CLAIMS

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Please amend the claim as follows:

1. (Original) A WDM (Wavelength Division Multiplexing) light source apparatus comprising:

N SOAs (Semiconductor Optical Amplifier) each having one end coated with a substance having a first reflection factor and the other end coated with a substance having a second reflection factor, the first reflection factor being higher than the second reflection factor, the N SOAs modulating respective input signals into optical signals according to a high-speed data signal to be transmitted, and amplifying the modulated signal;

a 1xN multiplexer/demultiplexer having one end composed of N terminals and the other end composed of one terminal, the N terminals coupled with the N SOAs; and

a reflective mirror, connected to the one terminal of the 1xN multiplexer/demultiplexer, for reflecting a first portion of a signal received from the 1xN multiplexer/demultiplexer;

means for allowing each of the N SOAs to create a broadband signal, and outputting the N broadband signal to the end coated with the substance of second reflection factor;

means for applying N broadband signals to the N terminals contained in one side of the 1xN multiplexer/demultiplexer;

means for performing spectrum-slicing on individual broadband signals to create a multiplexed signal, and outputting the multiplexed signal to one terminal contained in the other side of the 1xN multiplexer/demultiplexer;

means for allowing the first portion of the signals from the means for performing spectrum-slicing to be reflected from the reflective mirror, re-transmitting the reflected signals to one terminal of the 1xN multiplexer/demultiplexer.

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means for applying selected signals from among all signals from the means for performing spectrum-slicing to the reflective mirror, and transmitting the selected signals to a data transfer link;

means for demultiplexing the signals retransmitted to the 1xN multiplexer/demultiplexer, and transmitting the multiplexed signals to each one end of the SOAs connected to the N terminals, the one end being coated with the substance of the second reflection factor; and

means for amplifying signals received at the SOAs, reflecting the amplified signals from the second reflection factor substance, and re-transmitting the reflected signals to terminals connected to the 1xN multiplexer/demultiplexer through the one end coated with the second reflection factor substance.

2. (Canceled)

3. (Currently Amended) The apparatus as set forth in claim[[2]] 1, wherein the signals transmitted to the data transfer link have a narrow line width approaching a single-wavelength.

4. (Original) The apparatus as set forth in claim 3, wherein the line widths of the optical signals are calculated using an equation "each line width = $A/\sqrt{2B}$ ", where A is a Gaussian signal line width changing with frequency band characteristics of the 1xN multiplexer/demultiplexer, and B is a number of times during which the optical signals travel between the SOAs' ends coated with the first reflection factor substance and the reflective mirror.

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5. (Currently Amended) The apparatus as set forth in claim[[2]]1, wherein the 1xN multiplexer/demultiplexer is a WGR (Waveguide Grating Router).

6. (Original) A method for a WDM (Wavelength Division Multiplexing) light source apparatus, the apparatus including N SOAs each having one end coated with a substance having a first reflection factor and the other end coated with a substance having an second reflection factor, the first reflection factor being higher than the second reflection factor, a 1xN multiplexer/demultiplexer having one end composed of N terminals and the other end composed of one terminal, the N terminals coupled with the N SOAs; and a reflective mirror, connected to the one terminal of the 1xN multiplexer/demultiplexer, the method comprising the steps of:

a) allowing each of the N SOAs to create a broadband signal, and outputting the broadband signal to the end coated with the substance of second reflection factor;

b) applying N broadband signals created at the step (a) to the N terminals contained in one side of the 1xN multiplexer/demultiplexer;

c) performing spectrum-slicing on individual broadband signals received at the step (b) to create a multiplexed signal, and outputting the multiplexed signal to one terminal contained in the other side of the 1xN multiplexer/demultiplexer;

d) allowing a first portion of the output signals at the step (c) to be reflected from the reflective mirror, re-transmitting the reflected signals to one terminal of the 1xN multiplexer/demultiplexer, applying a second portion of the output signals selected from among all output signals of the step (c) to the reflective mirror, and transmitting the output signal signals to a data transfer link;

e) demultiplexing the signals retransmitted to the 1xN multiplexer/demultiplexer, and transmitting the multiplexed signals to each one end of the SOAs connected to the N terminals,

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the one end being coated with the substance of second reflection factor;

f) amplifying signals received at the SOAs, reflecting the amplified signals from the second reflection factor substance, and re-transmitting the reflected signals to terminals connected to the 1xN multiplexer/demultiplexer through the one end coated with the second reflection factor substance; and

g) repeating the steps (a) to (f).